

days at intensive care unit. The incremental cost per bed-day saved was R\$419,66. **CONCLUSION:** The NAGIS(c) model of managed high cost patient, called Case Management Program is cost-effective where the incremental cost per bed-day saved is \$419,66, and its return of investment is highly positive.

PHP31

DRUG PROXIES FOR IDENTIFYING SPECIFIC DIAGNOSES IN MEDICARE PART D

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OBJECTIVE: The purpose of this analysis was to develop a method for identifying Medicare Part D members with cardiovascular disease using medication proxies. **METHODS:** A binary matrix was created from cardiovascular medication prescription claims for Medicare Part D MAPD and commercial members from the first quarter of 2007. The binary matrix was subjected to factor/principal component analysis. The maximum valued factor loading for each of the generated components were then used to create a member/factor loading matrix. This matrix was used to derive beta coefficients, from logistic regression, to calculate a member's probability of having hypertension, CAD, or CHF. **RESULTS:** One-hundred and twelve factors were produced over 696,471 members prescribed cardiovascular medications. Different probability thresholds were evaluated to determine the sensitivity and specificity for the identification method. The threshold probabilities ran from >0.30 to >0.975. As the threshold probabilities increased, sensitivity/specificity for hypertension, CAD, and CHF ran from 0.99/0.50–0.50/0.99, 0.61/0.91–0.50/0.99, and 0.63/0.96–0.50/0.99, respectively. A similar result was produced using maximum score coefficients resulting from the principal component analysis. **CONCLUSION:** Although this approach to identifying members with medication proxies appears to separate members with and without certain cardiovascular conditions, it tends to exclude members at the cost of minimizing erroneously identified members.

HEALTH CARE USE & POLICY STUDIES—Drug Use

PHP32

WHAT'S DRIVING PRESCRIPTION COPAYMENTS?

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OBJECTIVE: Some contend that prescription copayment increases reflect a disproportional shifting of costs to members while others believe that copayments are simply keeping pace with rising prescription costs. To better understand the drivers of prescription cost sharing, this analysis examines recent trends in member copayments relative to total prescription costs. **METHODS:** The study is a retrospective descriptive analysis of prescription claims data for a sample of commercially-insured members enrolled with Express Scripts between 2002 and 2006. Plan sponsors included in the analysis offered integrated prescription coverage within an employer-based market (no Medicare or Medicaid). For each year, the data represent prescription claim activity for over 18 million members. Total per-prescription costs were calculated as the sum of the discounted ingredient cost, dispensing fee, administrative fees and any applicable tax divided by the number of 30-day equivalent prescriptions. Average member per-prescription cost was calculated as the total member cost divided by the total number of 30-day equivalent prescriptions. Costs were calculated separately for generics, preferred brands and non-preferred brand-name prescriptions. **RESULTS:**

From 2002 to 2006 the average total per-prescription cost increased \$10.23 or 20.5% while the average member per prescription copayment increased by \$1.70 or 14.3%. The proportion of total costs paid by members decreased from 24% in 2002 to 23% in 2006. Per-prescription member costs increased by 10% for generics, 25.7% for preferred brands and 58.6% for non-preferred brands. **CONCLUSION:** These findings suggest that plan sponsors are not shifting a greater proportion of costs to members, nor is member cost share keeping pace with rising prescription costs. Actual per-prescription member cost share increased at a modest rate, influenced by increased generic use which grew from 42% in 2002 to 58% in 2006.

PHP33

HERB/DIETARY SUPPLEMENT AND PRESCRIPTION DRUG USE TRENDS AMONG US ADULTS, 1999–2004

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OBJECTIVE: The aim of this study was to evaluate trends in the use of herbs and dietary supplements (HDS) in relation to prescription drug (Rx) use, as well as their individual use, among US adults from 1999–2004. **METHODS:** Data were abstracted from the 1999–2000 and 2003–2004 cycles of the National Health and Nutrition Examination Survey (NHANES). HDS included herbs, vitamins, minerals, and other supplements. Trends in HDS and/or Rx use were examined based on stratified characteristics (i.e., sociodemographics, insurance coverage, health care visits during the preceding year, chronic conditions). Sampling weights were adjusted to allow for the pooling of data from multiple waves. **RESULTS:** Overall, the proportion of HDS users increased from 51.2% during 1999–2000 to 53.0% during 2003–2004, while that of Rx users increased from 49.9% to 55.6% over the same period. Between 1999 and 2004, the proportion of HDS-only users decreased while the proportion of people who only used Rx increased. The concomitant use of HDS and Rx increased for most subgroups, except for those who had an annual household income less than \$14,999 or greater than \$65,000, and who had never have health care visits during the preceding year. **CONCLUSION:** Trends suggest that concomitant HDS and Rx use increased over the period of observation in the general US population. Further research is needed to investigate the outcomes of concurrent HDS and Rx use.

PHP34

PRINCIPAL COMPONENTS ANALYSIS OF DRUG UTILIZATION AND EXPENDITURE TRENDS FOR MAJOR THERAPEUTIC CLASSES IN U.S. MEDICAID PROGRAMS

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OBJECTIVE: Drug expenditures have been increasing much faster than spending on other medical services and have become burdensome for state Medicaid programs. This study was to analyze the trends of Medicaid drug utilization and expenditures across all major therapeutic classes and to identify their similarities and differences. **METHODS:** Quarterly Medicaid reimbursed drug prescriptions and dollar amounts for each drug were extracted from the national claims data from the Centers for Medicare & Medicaid Services for 1991 through 2004. Expenditures were aggregated across all drugs in 64 different therapeutic classes, providing 64 different time series of length 56 quarters

each. Principal components analysis (PCA) was then applied to the data to identify major types of expenditure trends across all the different therapeutic classes. **RESULTS:** In total, across all drugs in the 64 therapeutic classes, Medicaid spending increased from \$4.6 billion with 231 million prescriptions in 1991 to \$22.5 billion with 350 million prescriptions in 2004, representing total Medicaid spending on outpatient drugs during the time period. PCA revealed three principal components that accounted for 90 percent of total variation in Medicaid drug expenditure patterns. The first principal component (PC1), explaining 66 percent of the variation, is an exponential-like upward trend; PC2, explaining 17% of the variation, represents an increasing-then-decreasing expenditure pattern; and PC3, explaining 7% of the variation, represents an up-and-down cyclical expenditure pattern. Therapeutic classes exhibiting high correlation ($r > 0.9$) with PC1 include corticoid steroids, anti-neoplastics, anti-seizure agents, bone density regulators, anti-inflammatory agents, antiretroviral agents, antipsychotics, antidepressants, oral diabetic agents, and gastrointestinal agents. When PCA was applied to drug utilization trends, the same principal components were discovered and accounted for 92% of total variation in drug utilization patterns. **CONCLUSION:** Most drug therapeutic classes exhibited exponential-like upward expenditure trends, clearly contributing to the overall rising expenditure burden for Medicaid.

PHP35

CHARACTERIZING PHARMACY AND MEDICAL CLAIMS FOR A PRIVATE INSURANCE POLYPHARMACY POPULATION

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OBJECTIVE: To describe and characterize a group of private insurance members taking multiple medications over a one-year period. **METHODS:** Persons were selected for this polypharmacy analysis if they had at least five unique maintenance prescriptions in their pharmacy claims records for the period of January-March 2005, based on a customized list of chronic medications. The full set of pharmacy and medical claims for these members were evaluated for a 12-month period, October 2004 to September 2005. Standard descriptive statistics were calculated to characterize the population. Logistic regression models were used to assess the association of pharmacy claims and "safety events" (i.e., emergency room visits (ER) and hospitalizations (H)). **RESULTS:** The final analytic sample, having both pharmacy and medical coverage for the period, consisted of N = 14,890 members ≥ 19 years of age (66% female), from four U.S. states. There were over 93,000 unique pharmacy claims with a monthly average of 6.3 per member. Males (M) and females (F) had similar averages (M = 6.2; F = 6.3), yet males were more likely to have ER (12.1%M vs. 10.8%F, $p = 0.022$) and H (8.3%M vs. 6.3%F, $p < 0.0001$). Unadjusted logistic regressions estimated the effect of medication claims on ER and H as OR = 1.14, $p < 0.0001$ and OR = 1.18, $p < 0.0001$, respectively. This implies 14% and 18% higher odds of ER or H, respectively, for every unit increase in monthly medications. Adjusting for age and gender does not substantially affect these results. **CONCLUSION:** Evaluating serious medical events in sub-populations taking multiple prescription medications provides important information for health insurers trying to reduce ER and hospitalizations. In a privately insured polypharmacy sub-population, there was a strong association with these safety events and increased average monthly pharmacy claims. Private insurers should consider establishing managed care programs to

evaluate and improve the overall safety of their members taking higher numbers of monthly medications.

PHP36

RELATIONSHIP OF DOCTOR SHOPPING AND POLYPHARMACY: A NATIONWIDE STUDY IN TAIWAN

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OBJECTIVE: The National Health Insurance (NHI) system in Taiwan is characterized by 1) free choice of physicians and health care facilities without formal referral; 2) generous drug benefits; and 3) low co-payments. The NHI beneficiaries thus exhibit features of frequent attendances, frequent changes of physicians, and a higher number of drug items in a prescription. It is interesting to know how likely a doctor shopper is to be a patient of polypharmacy. **METHODS:** The data sources came from the historical claims datasets of 200,000-person cohort in 2005, offered by the National Health Insurance Research Database in Taiwan. The analysis was limited to the ambulatory records with conditions of chronic diseases, represented by visits with more than seven days of drug supply. For those people with at least one visit for chronic diseases, the degree of correlation between the total number of consulted facilities and the total number of distinct prescribed drug items in all visits for chronic diseases in 2005 would be determined. **RESULTS:** Of the study cohort 56,956 people (30,070 females and 26,886 males; mean age 49.9 ± 19.9 [SD] years) had at least one visit for chronic diseases in 2005. On average, one of these people had paid 6.8 ± 7.0 (max. 98) visits, consulted 1.5 ± 0.9 (max. 32) facilities, and received 7.3 ± 7.3 (max. 93) distinct drug items for chronic diseases in a year. The total number of consulted facilities for chronic diseases in a year was strongly correlated with the total number of distinct prescribed drug items in all visits for chronic diseases in a year (Spearman's rho 0.548, $p < 0.001$ [2-tailed]). **CONCLUSION:** More visits for chronic diseases at different facilities were related to more drugs prescribed. Besides the patients' reasons, the causes inherent in the health care system deserve investigations.

PHP37

THE EPIDEMIOLOGY AND OUTCOMES OF PATIENTS BY SERUM DIGOXIN LEVELS DURING HOSPITALIZATION

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OBJECTIVE: Dosing and therapeutic range of digoxin has recently changed based on results from clinical trials. We examined the epidemiology, mortality and length of stay (LOS) of patients with serum digoxin level results during hospitalization. **METHODS:** We retrospectively analyzed 4765 cases with serum digoxin levels from 2 institutions that electronically provided laboratory data from 2004–2006. Cases were stratified into the groups based on maximum serum digoxin level; <1.0 , 1.0 – 2.0 , 2.1 – 2.4 , and >2.4 . The actual to predicted hospital mortality and length of stay was compared across each strata with predicted mortality and LOS determined by previously described admission based clinical models. **RESULTS:** Approximately 3 in 5 cases (57.8%) had a serum digoxin level higher than the recommended range of <1.0 . The crude mortality for cases with digoxin levels <1.0 was 4.1% and 9.1% for those with digoxin levels ≥ 1.0 . After adjustment for severity of illness on admission cases with a digoxin level ≥ 1.0 had a significantly higher actual to predicted mortality ratio (1.3 [CI = 1.1–1.4]) than cases <1.0 (0.8 [0.7–1.0]). While crude LOS was higher for serum digoxin